The Examiner is respectfully requested to reconsider the withdrawal of claims 19-20.

Applicants respectfully submit that claims 19-20 are proper dependent claims and were properly added in response to the rejection of August 28, 2001. To follow the Examiner's position to its logical conclusion, any times claims are added after a first rejection which are properly dependent from an independent claim, a "distinct species" position could be taken.

The rejections:

Claims 1 and 18 under 35 U.S.C. § 102(b) as anticipated by Fukata.

Claims 1 and 18 under 35 U.S.C. § 103(a) as being unpatentable over Harwood, Ikeda or Auerbach, each in view of Fukata.

Claims 6, 8 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Harwood, Ikeda or Auerbach each in view of Fukata and Senga.

The Examiner's position is set forth in the Action in detail and will not be repeated herein except as appropriate.

The rejections are respectfully traversed.

Fukata:

Fukata teaches a sheet of polyphenylene sulfide (PPS) filaments having a fineness of 0.1-15 denier, which would be about 1-150 μm, made of a linear polymer having a degree of cross-linking and branching as defined by the non-Newtonian constant n of $0.9 < n < 2.0$ as defined by the formula $\dot{r} = 1/\mu x T^n$ (see col. 4, lines 1-4 of Fukata), where $\dot{r}$ is shear rate, T is shear force and μ is viscosity (see also claim 1 of Fukuta).

Fukata, thus clearly discloses a non-Newtonian constant n of $0.9 < n < 2.0$ which is extremely large and which would include polymer flow of almost all polymer structures, including not only linear-type structures but also branch-type structures. Usually, the non-Newtonian constant "n" is at most in the range of 1.5-1.6, even if a branched structure is developed in the polymer structure. As a consequence, it can reasonably be concluded that the limitation regarding the non-Newtonian constant of $0.9 < n < 2.0$ in Fukata is substantially no limitation at all regarding the non-Newtonian constant.

In more detail, Fukata discloses that PPS polymer filaments can be prepared from a branched PPS polymer in Fukata Example 4, but Fukata does not give any measured value for the non-Newtonian constant "n" of this branched PPS polymer. Further, Fukata provides insufficient information to calculate the non-Newtonian constant n, even noting the Fukata disclosure of a melt viscosity μ of 2,000 poise at a shear rate $\dot{\gamma}$ of 200 sec^{-1} at 300°C. As a consequence, one of ordinary skill in the art, referring to Fukata, would not see sufficient information to determine whether or not the branched PPS polymer of Fukata has a non-Newtonian coefficient of 1.05 or more or not. Clearly the disclosure in Fukata is insufficient to support an anticipation rejection based on Fukata alone, whether one looks for explicit or implicit disclosure in Fukata. The Examiner has advanced no reasons as to why one of ordinary skill in the art would assume or presume that the Fukata PPS polymer filaments in Example 4 would meet the limits of the claims of the present application or not.

Taking the disclosure in Fukata as a whole in context, it is quite clear that Fukata contains no suggestion of producing a fabric having a non-Newtonian coefficient in Examples 1-

4 of Fukata which is formed of a branched or cross-link PAS as disclosed in Table 1 of the present application (1.06 - 1.19 for Examples 1-4 of the present application) or of the corresponding branched or cross-linked PAS of the present application. Further, and quite importantly, it must be noted that the non-Newtonian coefficient of 1.05-1.20 of the PAS of the present invention was determined from the data disclosed in Table 1 on page 21 of the present specification. The data show that the melt-blown, non-woven fabrics of Comparative Example 1 (n = 1.02) and 2(n = 1.00) made of a linear PAS and of Comparative Example 3, made of an overly cross-linked PAS, each having a thick average diameter, yield extremely poor melt-blowing stability.

Accordingly, one skilled in the art, referring to Fukata, would see neither explicitly or implicitly the non-Newtonian limits of claims 1 and 18 of the present application and, as a consequence, the anticipation rejection over Fukata is improper and should be withdrawn.

Applicants now address the obviousness rejection of claims 1 and 18.

From the above discussion regarding the anticipation rejection based on Fukata, it is clear that Fukata fails to teach, either explicitly or implicitly, the melt-blown, non-woven fabric comprising PAS having a branched structure with a non-Newtonian coefficient of 1.05-1.20 as claimed herein.

Harwood, Ikeda and Auerbach are defective for the same reasons as set forth in Applicants' Amendment filed July 30, 2001.

In this particular rejection, the Examiner rejects claims 1 and 18 as unpatentable "as set forth in the last Action."

By "last Action", it seems quite clear that the Examiner means to refer to the Action of 01/31/01, and Applicants believe that the Examiner means to refer to paragraph 9 of that Action where the Examiner's position is essentially that if Harwood, Ikeda or Auerbach do not inherently teach PAS materials with a non-Newtonian coefficient of 1.05-1.20 as claimed herein, then it would have been obvious to one of ordinary skill in the art to use such a coefficient based on the teachings of Fukata, motivation being provided by the reasonable expectation of utilizing a polymer which is superior in spinnable and less liable to gelation.

With respect to Fukata, as earlier explained in detail, Fukata does not provide the motivation to use such a coefficient. Since this is an essential predicate of the Examiner's rejection, applicants submit that the rejection based on Hardwood, Ikeda or Auerbach in view of Fukata must also fail.

Rather than repeat verbatim here the comments offered in the Amendment filed July 30, 2001, which would just increase the length of this response, the Examiner is requested to refer to the Amendment of July 30, 2001, at the following points: regarding Harwood page 8; regarding Ikeda at pages 9-10; regarding Auerbach at pages 10-11 and 12.

As a consequence, the fatal flaws in the Examiner's rejection are easily seen.

Withdrawal is requested.

Turning now to the rejection of claims 6, 8 and 10 under 35 U.S.C. §103(a) as being unpatentable over Harwood, Ikeda or Auerbach each in view of Fukata and Senga, this rejection is respectfully traversed.

If the Examiner will refer to the present specification at page 8, it can be seen that the degree of branching of PAS can be controlled by adjusting the amount of the polyhaloaromatic compound added. The amount of the polyhaloaromatic compound is preferably 0.001-0.6 mol%, more preferably 0.01-0.3 mol%, based on 100 mol% of the alkaline metal sulfide (sulfur atom). PAS prepared using 0.001-0.6 mol% of polyhaloaromatic compound has a non-Newtonian coefficient of 1.05-1.20.

It is Applicants position that there is a critical molar ratio of the polyhaloaromatic compound (c) to the metal sulfide (a) both in the present application and that of (C) to (A) in Senga, and that this critical difference is such that Senga cannot be used, in combination with the other references, to properly reject claims 6, 8 and 10 as obvious. The Examiner is first requested to refer to Table 1 of Senga. The degree of branching of PAS can be controlled by the molar ratio of the polyhaloaromatic compound to the metal sulfide. Using trichlorobenzene as the polyhaloaromatic compound, the relationships used to control the degree of branching of PAS can be compared between Synthesis Example 1 and 2 in the present application versus Example 2, 4 and 6 in Senga as follows.

Synthesis Example 1: (a) Na_2S 15.4 kg (120.0 mol)

(b) p-dichlorobenzene 17.70 kg (120.4 mol)

[(b)/(a)] = 120.4/120.0 = 1.003/1

(c) 1,3,5-trichlorobenzene 32.42 g (0.179 mol)

[(c)/(a)] = 0.179/120.0 = 0.0015/1

[(c)/(b)] = 0.179/120.4 = 0.0015/1

n=1.13

Synthesis Example 2: (a) Na_2S 15.4 kg (120.0 mol)

(b) p-dichlorobenzene 17.52 kg (119.2 mol)

[(b)/(a)] = 119.2/120.0 = 0.993/1

(c) 1,3,5-trichlorobenzene 16.21 g (0.089 mol)

[(c)/(a)] = 0.089/120.0 = 0.0007/1

[(c)/(b)] = 0.089/119.2 = 0.0007/1

n=1.09

Example 2 in Senga: PDCB(B)/Na_2S(A) = 1.05/1

TCB(C)/Na_2S(A) = 0.008/1

[(C)/(B)] = 0.0076

n = not identified.

Examples 4, 6 in Senga: [(B)/(A)] = 1.05/1

[(C)/(A)] = 0.015/1

[(C)/(B)] = 0.014

n = not identified

As can clearly be seen from the above molar ratios, in Senga the molar ratio of trichlorobenzene to Na_2S [(C)/(A)] falls outside the molar ratio of 0.001-0.6 mol% based on 100 mol% of the alkaline metal sulfide (sulfur atom) in the present application. The only conclusion which can be reached is that the non-Newtonian coefficient of the PAS materials in Senga would be 1.30 or more, although Senga does not give any specific value for the non-Newtonian constant "n".

Thus, quite clearly, Senga teaches that the Senga PAS materials exhibit a high non-Newtonian behavior, have a high degree of branching, are not too high in average molecular weight and have a broad molecular weight distribution. See page 8, lines 12-14 of Senga. As a consequence, while the molar ratio of the dihaloaromatic compound (B) to the metallic sulfide

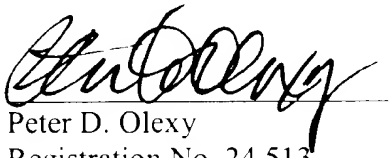
(A) [(B)/(A) ratio] may range from 1.035/1 to 1.300/1, and the molar ratio of the aromatic compound (C) having three or more than three functional groups to the dihaloaromatic compound (B) [(C)/(B) ratio] may range from 0.003/1 to 0.05 (see claim 5 and page 6, lines 5-11 of Senga), these molar ratios clearly fall outside the corresponding molar ratio [(b)/(a) ratio] which is nearly equal to one and the [(c)/(b) ratio] which ranges from 0.00001 to 0.0006/1 in accordance with the present application. In this regard, see the present specification at page 8, lines 4-7 and the Examples in the specification.

With respect to the process of making the branched or cross-linked PAS polymer, Senga is silent regarding any method for introducing a branched structure into PAS, and, of course, is silent regarding any method for cross-linking. Accordingly, it is quite clear that Senga fails to teach the branched or cross-linked PAS polymer having a non-Newtonian coefficient of 1.05-1.20 of the present invention.

Thus, even given the combination of references that the Examiner has made, the rejection is improper and should be withdrawn.

Withdrawal of all rejections and allowance is requested.

Respectfully submitted,



Peter D. Olexy
Registration No. 24,513

SUGHRUE MION, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037-3213
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

Date: February 25, 2002